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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,898	10/08/2003	Zhijun Qu	IR-2378 (2-3	6326
2352	7590	07/12/2005	EXAMINER	
OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403			MAI, ANH D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/680,898

Applicant(s)

QU, ZHIJUN

Examiner

Anh D. Mai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 15, 2005 has been entered.

Status of the Claims

2. Amendment filed June 15, 2005 has been entered. Claims 1-16 have been cancelled. Claims 17-26 have been added. Claims 17-26 are pending.

Specification

3. The disclosure is objected to because of the following informalities:

a) the amended paragraph [0017], lines 3-4, states: ("... below the sources 40, 41 and 42 respectively. ...".

However, as states in [0018], 40 is a gate oxide, 41 is a gate electrode and 42 is an insulation layer.

b) amended paragraph [0018] states: "a gate oxide 40 overlies the invertible channel regions **between** the source regions and respective channel regions".

Actually, the gate oxide 40 is between N body 23 and a polysilicon gate electrode 41.
(See Fig. 1).

c) paragraph [0024] states: "This keeps the avalanche current **away** from the R_b regions under source 33 so that the device can handle a much higher avalanche energy".

However, as shown in Fig. 3, the avalanche current is drawn toward the region 30, thus, contradicting the specification, which is away from R_b regions under source 33.

Appropriate correction is required.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: " R_b ".

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: " R_{G1} " is shown in Fig. 3, but does not describe in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

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renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 17-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17, line 11, recites: "...away from the R_b region...".

What is the "R_b region" ?

Where is the "R_b region" ?

The term has not been properly identified, thus the claims are indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 17-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Onishi et al. (U.S. Patent No. 6,586,801).

With respect to claim 17, as best understood by the examiner, Onishi teaches a semiconductor device as claimed including:

a semiconductor body region (22a) of a one conductivity type and having parallel top and bottom surfaces;

a plurality of spaced solid pylons of one material and another conductivity type extending through at least a portion of the body region (22);

a respective MOS gated structure (G) including a source region (14) disposed in a channel region (13) which is positioned above and in contact with each of the pylons, a first portion (22b) of each of the pylons being in charge balance with the surrounding body region (22a), and the second portion (30) of each of the pylons being disposed between a respective first portion (22b) and a respective channel region (13); each second portion (30) having a concentration of impurities higher than that of the first portion (22b) and a length together configured to draw avalanche current toward itself and away from the R_b region in the channel region. (See Fig. 1).

With respect to claim 18, the concentration of impurities in the second portion (30) of Onishi seems to be about 15-20% greater than that is the first portion (22b) as claimed.

With respect to claim 19, the length of the second portion (30) of Onishi seems to be about 25% of the length of the pylon as claimed.

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With respect to claim 20, the length of the second portions (30) of Onishi seems to be less than about 25% of the length of the pylon as claimed.

With respect to claim 21, the one conductivity of Onishi is N type and the another conductivity is P type.

With respect to claim 22, as best understood by the examiner, Onishi teaches a semiconductor device as claimed including:

a MOS-gated structure having an $R_{b'}$ region; and
a solid semiconductor pylon of one material and one conductivity type in a semiconductor body (22a) of another conductivity type, the solid pylon including one portion (22b) in charge balance with its surrounding semiconductor body (22a) and another portion (30) having a concentration of impurities higher than the one portion (22b), the another portion (30) being configured and positioned within the semiconductor body (22b) to draw avalanche current away from the $R_{b'}$ region. (See Fig. 1).

With respect to claim 23, the concentration of impurities in the another portion (30) of Onishi seems to be about 15-20% greater than that is the one portion (22b) as claimed.

With respect to claim 24, the length of the another portion (30) of Onishi seems to be about 25% of the length of the pylon as claimed.

With respect to claim 25, the length of the another portions (30) of Onishi seems to be less than about 25% of the length of the pylon as claimed.

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With respect to claim 26, the one conductivity of Onishi is P type and the another conductivity is N type.

Response to Arguments


8. Applicant's arguments with respect to new pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


ANH D. MAI
PRIMARY EXAMINER

July 7, 2005